

ABSTRACT

Disclosed are compositions and methods that can be used to effect a photodynamic therapy (PDT) such as cancer treatment or gene transcription. Compositions include light-emitting nanoparticles that

5 absorb light of one wavelength emitted by a light source and emit light of another wavelength that activates a PDT drug. Light-emitting nanoparticles include quantum dots, nanocrystals, and quantum rods as well as mixtures of these nanoparticles. The nanoparticles may be delivered to a patient in a liquid carrier or as part of a solid carrier such as

10 a biocompatible polymeric film, a polymeric sheath, or other carrier suitable for introduction at the site to be treated. In one embodiment of the invention, light-emitting nanoparticles are localized at the treatment site by either joining them to the PDT drug covalently or non-covalently through linkage groups such as biotin/avidin, or the nanoparticles are

15 localized at the treatment site by attaching the nanoparticles to a linkage group that has affinity for e.g. cells or proteins produced at the site to be treated. A sufficient number of light-emitting nanoparticles are delivered to the treatment site to activate the PDT drug and effect treatment.